Spook, Wyoming, Disposal Site

Long-Term Surveillance and Maintenance Program

U.S. Department of Energy
Grand Junction Office

FACT SHEET

The Grand Junction Office has provided cost-effective and efficient stewardship for more than 10 years

Overview

A facility to upgrade uranium concentrate before shipment was operated at the remote Spook, Wyoming, site from 1962 until 1966. The upgrading facility was located near several open pit uranium mines. The upgrading operations created process-related waste and tailings, a sandlike material containing radioactive components and other contaminants. The U.S. Department of Energy (DOE) encapsulated the materials in the bottom of an existing open-pit uranium mine at the millsite in 1989. The State of Wyoming Abandoned Mine Lands (AML) Program participated in filling the open pit mine and restoring the surface to its premining condition. Work was completed in 1989. The Spook Disposal Site is unique among DOE uranium mill tailings disposal sites because the disposal cell is completely buried. The other disposal cells are surface impoundments.

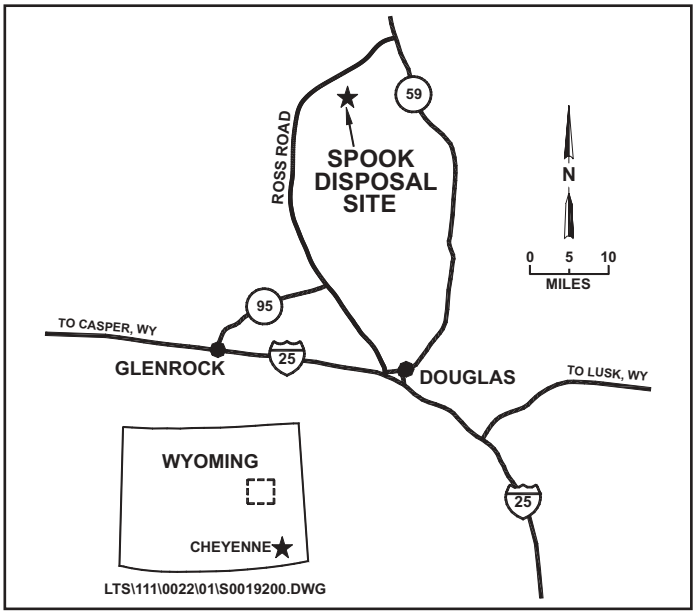
The U.S. Nuclear Regulatory Commission included the Spook Disposal Site under general license in 1993. DOE is responsible, under the general license, for the long-term custody, monitoring, and maintenance of the site. The DOE Long-Term Surveillance and Maintenance (LTSM) Program at the DOE Grand Junction (Colorado) Office is responsible for the long-term safety and integrity of the disposal site.

DOE established the LTSM Program in 1988 to provide stewardship of disposal cells that contain low-level radioactive material after completion of environmental restoration. The mission of the LTSM Program is to ensure that the disposal cells continue to prevent release of contaminated materials to the environment. These materials will remain potentially hazardous for thousands of years. As long as the cells function as designed, risks to human health and the environment are negligible.

The LTSM Program maintains the safety and integrity of the disposal cell through periodic monitoring, inspections, and maintenance; serves as a point of contact for stakeholders; and maintains an information repository at the DOE Grand Junction Office for sites in the LTSM Program.

Regulatory Setting

Congress passed the Uranium Mill Tailings Radiation Control Act in 1978 (Public Law 95–604) that specified



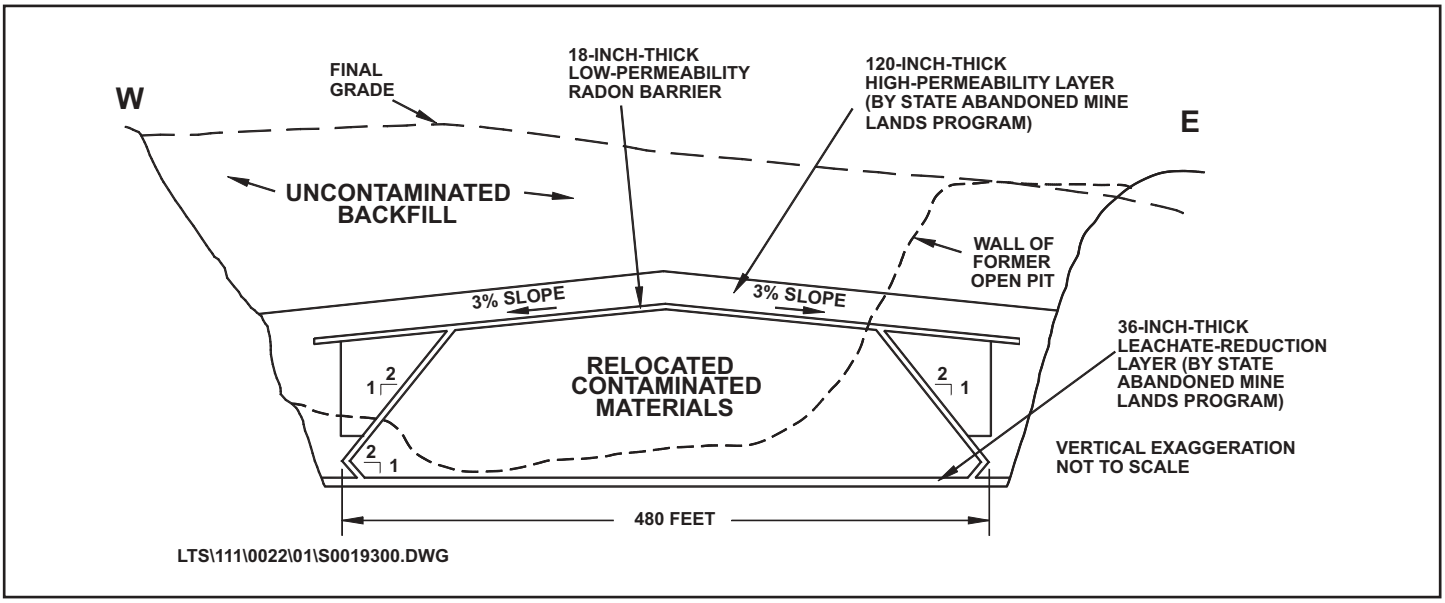
remedial action for 24 inactive millsites where uranium was produced for the Federal Government. DOE remediated these sites under the Uranium Mill Tailings Remedial Action Project and encapsulated the radioactive material in U.S. Nuclear Regulatory Commission-approved disposal cells. Cleanup standards were promulgated by the U.S. Environmental Protection Agency in Title 40 *Code of Federal Regulations* (CFR) Part 192. The U.S. Nuclear Regulatory Commission license was issued in accordance with 10 CFR 40.

Spook Disposal Site

The Spook Disposal Site is about 40 miles north of Glenrock, Wyoming, in Converse County. The site is surrounded by large, privately owned sheep and cattle ranches.

An open pit uranium mine, approximately 1,600 feet long, 500 feet wide, and 100 feet deep, was located adjacent to the former upgrading plant. Contaminated materials, including mill tailings, pond sludge, and building debris were encapsulated in the south-central part of the mine excavation. Stockpiles of overburden materials around the perimeter of the mine were used to fill the pit after the disposal cell was completed.

Groundwater occurs beneath the site in two sandstone units in the Tertiary Wasatch Formation. The upper aquifer is unconfined and the lower aquifer is confined or isolated from the surface and the upper aquifer. The



West-East Cross Section of Spook Disposal Site

upper and lower aquifers are separated by a thick silty shale aquitard, and no observed hydraulic connection exists between the two aquifers.

Water quality in the upper aquifer is affected by mineral deposits that contain uranium and selenium in concentrations exceeding limits established by the U.S. Environmental Protection Agency. Groundwater contaminated by the mill tailings exists in a plume in the upper aquifer that extends approximately 2,500 feet downgradient of the pit. Nitrate, uranium, selenium, chromium, and radium concentrations in the plume exceed background groundwater concentrations. Groundwater from the upper aquifer is not used as a drinking source in the vicinity of the Spook site. Several wells in the area tap the lower aquifer that is not affected by the milling operations or natural mineralization. Because the upper aquifer is contaminated by naturally occurring minerals, groundwater monitoring is not required.

Cell Design

The floor of the open pit mine was leveled and a 3-foot-thick layer of low-permeability material was placed in the bottom of the pit. The pit was backfilled with contaminated materials to within 45 feet of the surface and the top was sloped 3 percent. Low-permeability soil was compacted over the contaminated materials to reduce radon emissions and water infiltration. Above the low-permeability layer, a layer of high-permeability material was placed to direct any infiltrating water away from the contaminated materials and thus minimize leachate. The pit was then filled to the surface with low-permeability overburden materials and graded to encourage runoff. Surface contours were blended with the surrounding area and the site was seeded with native grasses.

LTSM Program Activities

The LTSM Program manages the site according to a long-term surveillance plan (LTSP) prepared specifically for the Spook site. Under provisions of the LTSP, the LTSM Program conducts annual inspections of this site to evaluate the condition of surface features and performs site maintenance as necessary.

The disposal cell at Spook is designed and constructed to last for 200 to 1,000 years. However, the general license has no expiration date, and DOE understands that its responsibility for the safety and integrity of the Spook site will last indefinitely.

Contacts

For more information about the LTSM Program or about the Spook Disposal Site, contact

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http://www.gjo.doe.gov/programs/ltsm